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AUTHOR Wojtowicz, G. Greg
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ABSTRACT

Are students aware of the link between environmental hazards and disease? What are the parameters of individual and social responsibility as they relate to environmental protection? What are the attitudes that inhibit or support the development of environmental protection behavior? Answers to these questions may help teachers to develop effective environmental education curricula and application-oriented classroom activities. The purpose of this paper is to provide an overview of the outcomes associated with a psychometric survey of students' environmental attitudes. A review of relevant literature shows that student attitudes are important components in the development of knowledge and behavior-based interventions. The descriptive study that served as the basis of this paper designed, tested, and implemented a psychometric instrument whose purpose was to collect information about the attitudes of students as they relate to environmental protection and health. A 16-item questionnaire focused on subjects' perception of social versus individual responsibility for environmental protection. Subjects (N=7,834) were drawn from elementary, middle, high school, and university student populations in Alabama and North Carolina. Data indicated that subjects from different states had different environmental attitude predispositions and that subjects from varied ethnic backgrounds and different grade categories had significantly different attitudes. Subjects were aware of the link between environmental hazards and health and felt that individuals are responsible for exercising the control necessary to effect change. In addition, subjects believed that environmental protection must start with the individual but collective effort at the societal level is necessary for success. (Contains 16 references, the survey instrument, and 9 tables.) (Author/ND)

ED 386 447

# Health and Environmental Protection: A Survey of Student Attitudes

Dr. G. Greg Wojtowicz, Assistant Professor of Health Promotion

Department of Health Promotion and Kinesiology
University of North Carolina at Charlotte
Charlotte, NC 28223
(704) 547-4696
FAX (704) 547-3350
E-Mail GGWOJTOW @ UNCCVM.UNCC.EDU

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**Abstract:** Are students aware of the link between environmental hazards and disease? What are the parameters of individual and social responsibility as they relate to environmental protection? What are the attitudes that inhibit or support the development of environmental protection behavior? Answers to these questions may help teachers to develop effective environmental education curricula and application oriented classroom activities. The purpose of this article is to provide an overview of the outcomes associated with a psychometric survey of students' environmental attitudes. Data may serve to shed light on factors that support or inhibit the development of effective environmentally protective management behavior. A review of literature showed that student attitudes are important components used in the development of knowledge and behavior-based interventions. The purposes of the descriptive study that served as the basis of this article was to design, test and implement a psychometric instrument designed to collect information about the attitudes of students as they relate to environmental protection and health. A sixteen-item questionnaire, developed by the author, focused on subjects' perception of social versus individual responsibility for environmental protection. Subjects (N = 7,834) were drawn from elementary, middle school, high school and university student populations in Alabama and North Carolina. Test-retest reliability of the questionnaire was .69 while Cronbach's Alpha was .71. Data indicated that subjects from different States had different environmental attitude predispositions. Further, subjects from varied ethnic backgrounds and different grade categories had significantly different attitudes. Subjects were aware of the link between environmental hazards and health and felt that individuals are responsible for exercising the control necessary to affect change. In addition, subjects believed that environmental protection must start with the individual but collective effort at the societal level is necessary for success.

## INTRODUCTION

The ecologically interdependent systems that make life on earth possible are at risk. Consequently, individual health status is becoming increasingly tied to the "health" of the planet. Health crises such as Love Canal and "Cancer Alley" (the eighty mile corridor containing 136 petrochemical and industrial plants which runs from Baton Rouge to New Orleans, LA.) may become more frequent if existing environmental hazards are not identified and eliminated. Sudden Infant Death Syndrome, Multiple Sclerosis and other common health problems have been linked to specific environmental locations and variables. In addition, "[environmental] stress (stress systompts caused by environmental factors: noise, crowded conditions, polluted air, water, etc.) is also believed to be a contributing factor in the onset of some diseases, and can increase the severity of preexisting illnesses, possibly by lowering immune system responses" (ATSDR, 1995). Researchers at the National Institute for Environmental Health Science (NIEHS Clearinghouse, 1995) stated that, "environmentally related human disease results from three interactive elements: (1) environmental exposures, (2) individual susceptibility and (3) time." Consequently, a lack of knowledge and informed attitudes about the interactive effects of these variables and multiple environmental hazards

only serves to compound environmentally-related health problems; especially those of students because children have much less control over their environment than do adults. As it relates to the environment, the future health status of students may be linked not only to what they know but how they fell about the environment.

"Environmental factors play a central role in the processes of human development, health and disease. Similarly, human factors play a central role in the nature and effects of environmental change" (U.S. Department of Health and Human Services 1992). Consequently, environmental education must, in some way, be linked to the health of all mankind. "Education is the fundamental strategy for accomplishing this goal" (Dunnette,1989). Clearly, institutionalized behaviors that give rise to the existence of environmental hazards and the complementary attitudes that threaten health must be identified and changed. A primary goal of environmental education must be to modify or change institutionalized behaviors that damage the environment, to view a violation of the biosphere as being a violation of self (Rees,1988).

**Purpose**

The purpose of this project was to identify existing environmentally

related attitudes of selected student populations in order to shed light on factors which support or inhibit the development of effective environmentally protective management behaviors. Thereafter, teachers may use data about student attitudes to develop environmental curricula and application oriented activities. The specific purpose of the descriptive study that served as the basis for this article was to design, test and implement a psychometric instrument designed to collect information about the attitudes of students as they relate to environmental protection and health.

**Research Literature**

School-aged children and their environmentally-related behaviors represent the future of environmental protection and management in this nation. In the United States, the environment is a defensible attitude but not a defensible issue. In general, people give verbal support to environmental protection but when it comes to giving up creature comforts to facilitate effective environmental management, convenience often wins out. The students of today will be charged to deal with the environmental hazards and problems of the new millennia. If we are to take our responsibility as educators seriously, we must enlighten

students, influence them to make the environment a high priority issue and empower them to pro actively defend it. Unfortunately, very little is known about children and their behavior and attitudes as they relate to the environment.

Children's Environmental Health Network (CEHN) director Joy Carlson stated, "Children [students] are both data and policy orphans when it comes to the environment. "As a nation, we are not doing a good enough job of protecting children [students] from environmental hazards" (Carlson, 1994). Consequently, educators are not doing a very good job of providing a supportive context in which children can apply the environmentally protective behaviors they learn in school and thereafter, develop a measure of control over existing environmental hazards.

The Children's Environmental Health Network (CEHN) recommends that "new research paradigms need to be developed to study long-term, delayed and potential transgenerational health effects resulting from environmental exposures" (CHEN, 1994). To date, very little research has been done in the area of attitude identification and behavior change in relation to the environmental protection behaviors of children.

Smith-Sebasto and Fortner (1994) developed a self-report environmental action index (Environmental Action Internal Control Index)

to assess the relationship between locus of control reinforcement and environmentally responsible behavior in undergraduate students. Riechard and McGarrity (1994) studied student (early adolescents 11-14 years) perception of risk relative to environmental hazards and found that as a group, students believed that people [population] posed the least risk. Musser and Malkus (1994) developed a scale to measure the environmental attitudes of school age children.

It is clear that these researchers consider attitudes critical to the investigation of environmentally related behaviors. Utilization of these data to develop effective environmental curricula and programming may assist attitudinal development and initiate positive behavioral change. "The attitudes inherent in a society are crucial to environmental problem-solving" (Trudgill, 1990). Unfortunately, existing environmental education continues to focus primarily on knowledge. Keen (1991) suggests that knowledge has no practical value if it is not supported by positive attitudes. Thirty years ago, in his book "Logic of Collective Action," Mancur Olson (1965) observed that, "unless there is coercion or some special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests." Given the number of environmental problems that our society,

it appears that very little has changed attitudinally over the last thirty years.

One may argue that individual and/or collective human behavior creates environmental hazards and that attitudes form the basis for those behaviors. Logically, an enlightened student population with an active awareness of environmental hazards and their effects on health would then give rise to an adult population capable of practical solutions to environmentally-based problems. "One of the spurs to resolution implementation is how much people care about environmental issues" (Trudgill, 1990). Researching the attitudes which inhibit or support environmentally protecting behaviors may shed light on specific methods that may be used to develop effective attitudinal and behavioral change strategies.

In his philosophy of conservation, Aldo Leapold (Sand County Almanac, 1949) suggested that Nature has an inherent value beyond its economic potential and challenged each individual to give value to environmental components. This project was concerned with the identification of varied components of that valuing process and represents the next logical step in the integration of applied learning and its effect on value systems existing within environmental education curricula.

## Environmental Curricula

As it applies to children, Abraham Lincoln said, "A child is a person who is going to carry on what you have started. The fate of humanity is in his hands. So it might be well to pay him some attention." Students represent a very important "attitude group;" people of like mind, irrespective of social and/or economic background. The environmental future of this planet will be decided by the children of the new millennia.

Pro active environmental stewardship is most often associated with a sense of personal responsibility, social awareness and a commitment to act. People who value the natural world and believe that it is important to exercise control over environmental hazards are those who are most active in environmental protection and the most effective. Consequently, attitudes are important curricular variables when seeking to develop effective environmentally protective behaviors. However, "the initial task of those concerned about an environmental problem is creating awareness that a problem exists" (Johnston, 1989). Environmental education must go beyond simply informing the student about environmental problems.

Passive exploration of data contained within educational media and classrooms will not affectively prepare students to accept personal and/or social responsibility for protecting the environment and thereby

reduce risks to their health. Students must be engaged and challenged by the environment if they are to truly value the natural world and develop pro active environmental management behaviors that they will use throughout their lives. The task requires an applied, action oriented, sensory, experiential, attitudinal approach to teaching about the environment. Effective programming focuses on motivating the individual to accept both personal and social responsibility for environmental protection and effective management. This acceptance is crucial to understanding the breadth of environmental problems which exist in our world and how those problems may impact upon human health.

The "device" to which Mancur Olson referred, may be the establishment (in the minds of students) of an direct link between environmental hazards and individual health status. Consequently, this concern for health may be the spur that motivates active environmental protection. Further, a comprehensive understanding of the responsibilities associated with individual and social behavior is required to initiate positive action that will serve to change institutionalized behaviors that damage the ecosystem. In that way, individuals may be empowered to accurately identify environmental hazards in order to reduce health related risk.

Schools in the United States are charged to promote environmental stewardship as a national ethic (United States Environmental Protection Agency, 1991). Societal organization and related value systems have considerable impact upon environmental management. Therefore, schools at all levels can be effective agents of change and venues where solutions to environmental problems are formulated.

It is essential to identify the basic attitudes of the target group when developing environmental curricula or when creating environmental interventions. Identification of critical attitudes may provide the necessary data needed to effect positive changes in environmental protection behaviors. This descriptive study was designed to identify existing environmental attitudes and to determine if the subjects were aware of the link between environmental hazards and health. It included subjects from elementary, middle school, high school and university-based populations in North Carolina and Alabama. The purpose of the project was to develop and evaluate a psychometric instrument designed to identify the environmental attitudes of student populations. Specifically, the nature of the task was to develop an instrument, test the questionnaire, implement a pilot test and evaluate the results.

### Subjects

Subjects in this study represented a sample of 8,834 students from four different public/parochial schools (four different districts) in two Southern States; Alabama (7,054) and North Carolina (1,780). The sample included subjects from a University campus in North Carolina. Ten grade levels found within four grade categories were represented (2,804 elementary students, 1,918 middle school students, 2,953 high school students and 1,159 university students). The sample consisted of 4,315 males and 4,519 females ranging in age from 8 to 52. Five ethnic groups were represented: 6,333 Whites, 1,142 African Americans, 375 Orientals, 371 Native Americans and 613 Hispanics.

## INSTRUMENTATION

### Development of the Questionnaire

Construction of the questionnaire was founded upon three behavior related concepts: (1) social versus individual responsibility for environmental protection, (2) the link between environmental hazards and health status and (3) variables that either support or inhibit environmentally protective behaviors. A modified Delphi technique was used to develop survey items. Health professionals, students and teachers

were asked to generate questions related to the basic concepts. Specific word combinations with links to environmental issues were chosen for inclusion within individual items on the questionnaire (Figure 1). Word groups such as healthy environment, hazards and health, collective effort and individual control were used to focus attitudinal responses. Four different versions of the questionnaire were generated (elementary, middle school, high school and college), each modified to fit the reading capability of the target group using the SMOG Readability Formula (McGraw, 1982).

Items were pilot tested within varied random groups of convenience (grade, gender, ethnic group) by members of the Delphi team who had written the questions. These pilot subjects (N = 25) were given the opportunity to complete the questions and thereafter, discuss the relative pros and cons of each item with the tester. In this manner, words, phrases and items were eliminated/added where needed. Items were written to allow the subject to make an attitudinal response.

**Items**

Individual items dealt with environmental protection, the implementation of environmental laws, health status and

individual/social responsibility for environmental protection within the context of the broad areas that served as the basis of the questionnaire. Twenty-five items were chosen as being representative of these contextual areas. The items were placed into a Likert Scale format (1 Strongly Disagree to 5 Strongly Agree) and again, pilot tested with formal groups of students (N = 165) from elementary, middle school, high school and college classes of convenience.

**Reliability**

The pilot testing within grade levels allowed for test-retest reliability analysis. The test-retest protocol was as follows: elementary, middle school and high school subjects were given an initial test, a six week retest and a twelve week final test. The university-based subjects were only tested twice, once at the beginning of the sixteen week semester and again at the end. This process generated a combined questionnaire test-retest reliability of .69.

Cronbach's alpha was calculated to determine the internal consistency of the questionnaire. The alpha for the 25-item instrument was .71. Eleven items, most representative of the basic concepts (alpha: .69) were chosen for the final scale. In the final stages of development,

instrument reliability gave way to a desire to investigate specific attitudinal and behavioral issues. Several items with less internal consistency were reworded to facilitate data collection about a specific topic. For example, the item related to incentives (rewards) for appropriate environmental behaviors was weak in terms of its correlation with other items. However, the Delphi team felt it was an important concept that needed to be left in the instrument matrix. Five additional topic related items were added which reduced the alpha of the final copy of the questionnaire to .67. The team was not content with this level of reliability but due to time constraints, the decision was made to go forward with data collection.

## METHODS

### Data Collection

Questionnaires were given to subjects of this study during regular (science, health, math, safety management) class meeting times by cooperating teachers. None of the subjects or the classes that participated in this study were involved in any formal environmental education instruction at the time this survey was administered. Participants completed demographic data at the beginning of the

questionnaire and thereafter responded to 16 Likert scale questions.

### Data Analyses

Data were analyzed using (1) a Principal Axis Factor Analysis with Varimax Rotation to determine if separate subscales (Factors) of environmental attitudes existed, and (2) a series of one-way ANOVA's with Tukey's HSD test to determine if there were significant differences between groups. The Factor Analysis technique is used to: (1) identify underlying dimensions or relationships that account for observed relationships among variables, (2) identify trends within psychological constructs and (3) reduce a large number of variables to a smaller, more manageable set of data (Leary, 1995).

## RESULTS

### Factor Analysis

A Factor Analysis was performed on the 16-item "Environmental Attitudes Questionnaire" (EAQ). The analysis identified a factor structure based on the correlations among the items in the questionnaire (Leary, 1995). The three factors that emerged from the analysis were reviewed in an attempt to describe and explain separate subscales (dimensions) of

environmental attitudes. The questionnaire produced three dimensions of environmental attitudes: (1) individual/social commitment to environmental protection, (2) methods and solutions to environmental problems and (3) behavioral control within environmental protection. The following descriptions emerged from the Factor Analysis (Figure 2):

**Factor 1** (Eigen Value, representative of the strength of the correlation: **3.80**, Percent of Variance: **23.8**) **Individual/Social Commitment:** This factor contained items that were associated with commitment to environmental protection on the individual and social level. Factor loading (correlations of the variables within the Factor with the Factor itself; a loading correlation of at least ± .30 is considered acceptable) for the items in this Factor were very high ranging from .68 to -.49. Individual items within Factor 1 can be found in Table 1.

**Factor 2** (Eigen Value: 1.55, Percent of Variance: 9.7) **Methods and Solutions:** This factor contained items that were associated with a varied approach to environmental protection (legislation, incentives, collective effort). Individual items within Factor 2 can be found in Table 2.

**Factor 3** (Eigen Value: 1.45, Percent of Variance: 9.1) **Control:** This factor contained items that were associated with variables that

affect individual efforts within environmental protection. Data associated with the control Factor are found in Table 3.

**Analysis of Variance**

Students scores (sumative Likert responses), in general, may be representative of the strength of personal commitment to the environment or the relative value students gave to environmentally related concepts found within the questionnaire items. These scores were recoded to equalize inversely scored items. Thereafter, a series of oneway ANOVA tests were performed to determine if significant differences existed between the mean scores of students within groups or categories (State, grade category, gender and race).

Student means were significantly different within North Carolina (20.52) and Alabama (18.64) within all three Factors (FACTOR 1, $F = 70.24$, df 1, 622.66, $p = .0000$; FACTOR 2, $F = 68.12$, df 1, 676.12, $p = .0000$; FACTOR 3, $F = 91.23$, df 1, 627.60, $p = .0000$). Majority responses to individual items within the questionnaire (by percentage) from North Carolina subjects were stronger (11 out of 16 responses were "Strongly Agree") and more consistent than subjects in Alabama (no "Strongly Agree" responses, 7 "Agree Somewhat and 6 "Agree" responses).

Student mean scores within all grade categories (Elementary: 22.18, Middle School: 21.26, High School: 19.31, University: 20.18) were significantly different for all three Factors (FACTOR 1, F = 86.02, df 3, 2007.62, p = .0000; FACTOR 2, F = 47.71, df 3, 1166.61, p = .0000; FACTOR 3, F = 246.22, df 3, 3441.25, p = .0000). Student mean scores within gender categories (males: 19.79, females: 20.52) were significantly different only within Factor 2 (F = 16.08, df 1, 166.1591, p = .0001). There were significant differences between ethnic categories within all three Factors (FACTOR 1, F = 8.42, df 4, 307.78, p = .0000; FACTOR 2, F = 2.98, df 4, 124.03, p = .01; FACTOR 3, F = 9.03, df 4, 259.66, p = .0000). Hispanics (22.04) had significantly higher mean scores than did Orientals (21.20) Whites (20.52), African Americans (20.48) and East Indians (20.35).

## Discussion

As a sample population (Table 4), subjects were united in their support of specific environmental concepts as evidenced by the majority responses to the following items. First, students felt that it was not too late to save the environment (Strongly Disagree, 53.4% in response to the suggestion that it is too late for efforts to be successful). Subjects

believed that there is a link between environmental hazards and health (Strongly Agree, 49.9%) and that collective effort is the only solution to environmental problems (Strongly Agree, 48.5%). In response to the item, "Teachers are doing a good job informing students about environmental problems" subjects either "Agree Somewhat" (37.3%) or "Disagreed" (28.4%). Finally, students felt that more and tougher laws should be enacted to direct environmentally protective behavior (Agree, 37.8%) and that their commitment to environmental protection has a direct effect on their health (Agree, 36.4%).

More specifically, students felt that environmental problems are the result of habitual, individualized behaviors (Agree: 36.6%). Subjects felt that incentives for appropriate behavior may be helpful (Agree Somewhat: 28.5%) and that an extreme environmental posture is not an inhibiting variable (Environmental extremists make me angry, Strongly Disagree: 31.4%) indicating that a pro active approach to solving problems may be acceptable.

Variances within sample subgroups revealed surprising information. Student responses from each State were significantly different (Table 5). North Carolina subjects were more committed to a form of pro active behavior (10 out of 16 Strongly Agree majority

percentage responses) whereas subjects from Alabama less committed and less pro active. In response to the question, "Teachers are doing a good job informing students about environmental problems," North Carolina subjects "Strongly Disagree" (33.2%) whereas Alabama subjects "Agree Somewhat" (36.2%). In response the question, "Solutions to health related environmental problems are created by societies, not individuals like me," North Carolina subjects responded "Strongly Agree" (36%) whereas Alabama subjects responded "Disagree" (36.6%).

High school subjects had the lowest mean scores within all grade categories whereas, mean scores peaked at the elementary grade levels. With the emphasis on environmental education and the accessibility of environmentally related information through a multiplicity of sources, one would assume that the scores of the older students would reflect stronger environmentally protective predispositions because of broader cognitive capability and a wide range of experiences. However, elementary school subjects where the most committed to environmental protection (14 out of 16 Strongly Agree percentage responses) whereas college and high school subjects were the least pro active (Table 6). In response to the question "Solutions to health related environmental problems are created by societies, not individuals like me," elementary subjects "Strongly

Agree" (63.6%) whereas college subjects "Disagree" (50.3%). In response to the question "Incentives/rewards would help me to change my behavior as it relates to the protection of the environment," elementary subjects "Strongly Disagree" (39.9%) whereas college subjects "Agree" (37.1%).

Specifically, males and females were in accord relative to concepts found in the questionnaire (Table 7). Both genders overwhelmingly supported collective efforts as a solution to environmental problems (Strongly Agree: Male & Female, 48.5%) and believed that there was a link between environmental hazards and health (Strongly Agree: Males, 47.8%; Females, 51.8%). Both males and females believed that it was not too late to save the environment (Strongly Disagree: Males, 49.8%; Females, 56.7%) and both responded negatively to the assertion that Teachers were doing a good job informing students (Strongly Disagree: Males, 25.9%; Females, 30.2%).

Ethnic responses were very pro active within all categories except for Hispanics who were, in general, less environmentally predisposed (Table 8). Oriental subjects were opposed to the use of incentives to initiate environmentally protective behavior (Strongly Disagree: 55.6%). African American subjects were most verciferious in their response to the suggestion that it was too late to save the environment (Strongly

Disagree: 81.1%), registering the most pro active response seen within the study. Orientals and Hispanics felt that family and friends did not affect their environmental behaviors (Orientals: Strongly Disagree, 33.3%; Hispanics: Disagree, 36.4%) whereas Whites, African Americans and Native Americans felt that it did affect their behavior. Finally, African American subjects were the only sub sample group to agree with the assertion that solutions to environmental problems are created by societies, not individuals (Strongly Agree: 59.5%); all other groups disagreed.

**Conclusions**

Students who participated in this study were keenly aware of the link between environmental hazards and health. They were aware of the difference between individual and social responsibility and expressed a commitment to the importance of both within the context of environmental protection. Subjects felt that the solutions to environmental problems begin with the individual but should be implemented at the societal level.

Data indicated that subjects from different States had somewhat different environmental attitudinal predispositions. In addition, subjects from varied ethnic backgrounds, different grade categories and ethnic

groups had significantly different attitudes. Specifically, subjects were aware of the link between environmental hazards and health and felt that individuals are responsible for exercising the control necessary to affect change. Subjects felt that environmental protection starts with the individual but collective effort at the societal level is necessary for success.

From these data, one may conclude that variables which support environmentally protective behaviors would include a pro active approach which consists of activities that involve collective efforts supported by broad-based legislation. Conversely, variables which inhibit the development of protective behaviors are based within the mundane, institutionalized behaviors of our technological society. Specifically, the population consumption behaviors which are so damaging to the environment. Based on subjects responses, it would appear that many students felt that, outside of the home, individuals may feel that there is little they can do to affect sweeping changes that will benefit the natural world.

Finally, although teachers are doing heroic work, subjects felt that teachers were not doing as good a job as one might hope. Obiviously, teachers need more support and resources to assist their efforts within

environmental education. Perhaps a nationwide education program which includes adults as well as school-aged children is needed to make environmental education a lifelong experience and thereby take the pressure off the individual classroom teacher.

The sample from North Carolina was taken from a metropolitan region with a population of well over one million. The Alabama sample was taken from a rural county with a population of less than 110 thousand. Considering that the North Carolina and Alabama smaples were Urban and Rural respectively, one may conclude that there are significant differences due to demographics. However, other questions remain unanswered. "Why were older students (college and high school) more supportive of incentives for behavior than were elementary school students? Why did all subjects support the concept of "more and stricter laws to change behavior?"

If it is true that existing environmental curricula assume that, in general, all students share common environmental attitudes; clearly the needs of individuals and groups may not be effectively met. Consequently, information from this type of research may prove to be invaluable in future programming decisions in environmental education.

Although the questionnaire appeared to be effective in collecting

data associated with student attitudes, much more research in the area of environmental attitudes and the effects on environmentally protective behaviors is needed. This questionnaire will be revised, readministered, with improved reliability in the hope that it will be useful in the development of effective environmental education programming.

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**Figure 1**

**A Survey of Environmental Attitudes**

This survey is designed to identify your attitudes about the environment and environmental protection.

1. A healthy environment in which to live, is the most important topic affecting the future of high school students today.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

2. My individual efforts within environmental protection each day can directly improve our environment.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

3. More and tougher laws should be passed to change individual behavior related to environmental protection.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

4. There is a direct link between environmental hazards and my health.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

5. A personal concern for the environment is necessary for improvements in the environment.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

6. Collective effort (all members of society) is the only solution to environmental problems.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

7. High school students have little control over environmental problems that exist in the world.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

8. Incentives/rewards would help me to want to change my behavior environmental protection behavior.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

9. It is too late for our efforts to save the environment to be successful.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

10. Environmental problems are the result of the habits or behavior of everyone who lives in our society.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

11. The attitudes of my friends and family affect my environmental protection behavior.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

12. Environmental extremists (tree huggers) make me angry and unwilling to make a commitment to protect the environment.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

13. Teachers are doing a good job informing students about environmental problems and environmental protection.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

14. Solutions to health related environmental problems are created by society, not individuals like me.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

15. I am willing to work in environmental protection even if it takes more effort and sacrifice on my part.

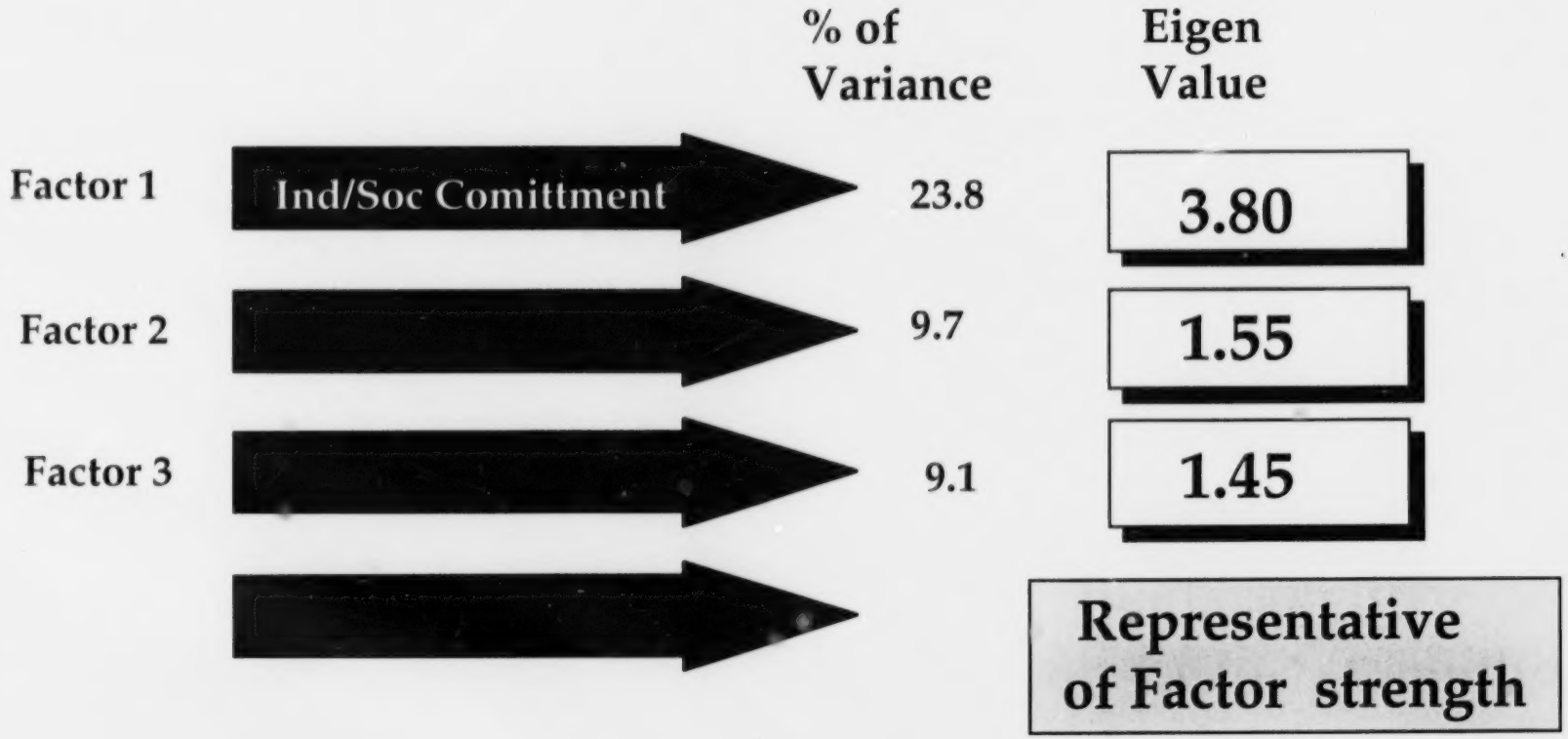
| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

16. My commitment to environmental protection has a direct effect on my personal health.

| Strongly Disagree | Disagree | Agree Somewhat | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

**Figure 2**

# Vari Max Factor Analysis



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**Factor 1**

# FACTOR ANALYSIS

Table 1

## Environmental Attitudes Questionnaire

| Loading | Item | Respone |
|---|---|---|
| | **Individual & Social Commitment** | |
| .68 | My individual efforts within environmental management each day can directly improve our environment. | Strongly Agree |
| .65 | My commitment to environmental protection has a direct effect on my. personal health. | Strongly Agree |
| .64 | A healthy environment is the most important concern affecting students today. | Agree Somewhat |
| .59 | I am willing to make the commitment to environmental protection even if it takes more effort and sacrifice on my part. | Strongly Agree |
| .58 | Collective effort (all members of Society) is the only solution to environmental problems. | Strongly Agree |
| .51 | There is a direct link between environmental hazards and human health. | Strongly Agree |
| .50 | Teachers are doing a good job informing students about environmental problems. | Strongly Agree |
| -.49 | It is too late for our efforts to save the environment. | Strongly Disagree |

**Factor 2**

# FACTOR ANALYSIS

Table 2

## Environmental Attitudes Questionnaire

| Loading | Item | Response |
|---|---|---|
| | **Method/Solutions** | |
| -.59 | Solutions to health related problems exist at the societal level, not at the individual level. | Strongly Agree |
| .53 | Teachers are doing a good job informing students about the environmental problems. | Strongly Agree |
| .46 | My individual efforts within environ-- mental management each day can directly improve our environment. | Strongly Agree |
| .41 | My commitment to environmental protection has a direct effect on my. personal health. | Strongly Agree |
| .33 | I am willing to make the commitment to environmental protection even if it takes more effort and sacrifice on my part. | Strongly Agree |
| .32 | Collective effort (all members of Society) is the only solution to environmental problems. | Strongly Agree |
| .30 | A healthy environment is the most important concern affecting students today. | Strongly Agree |

Factor 3

# FACTOR ANALYSIS

## Environmental Attitudes Questionnaire

Table 3

| Loading | Item | Response |
|---|---|---|
| | **Control** | |
| .59 | Incentives/rewards would motivate me to change my behavior as it relates to the protection of the environment. | Strongly Disagree |
| .54 | Students have little control over environmental problems that exist at the global level. | Strongly Agree |
| .52 | Environmental extremists make me angry and unwilling to make a commitment to protect our environment. | Agree Somewhat |
| -.41 | It is too late for our efforts to save the environment to be successful. | Strongly Disagree |
| .33 | The attitudes and behaviors of those around me influence my behavior as it relates to to the environment. | Strongly Agree |

Table 4

# Sample Responses to Selected Items

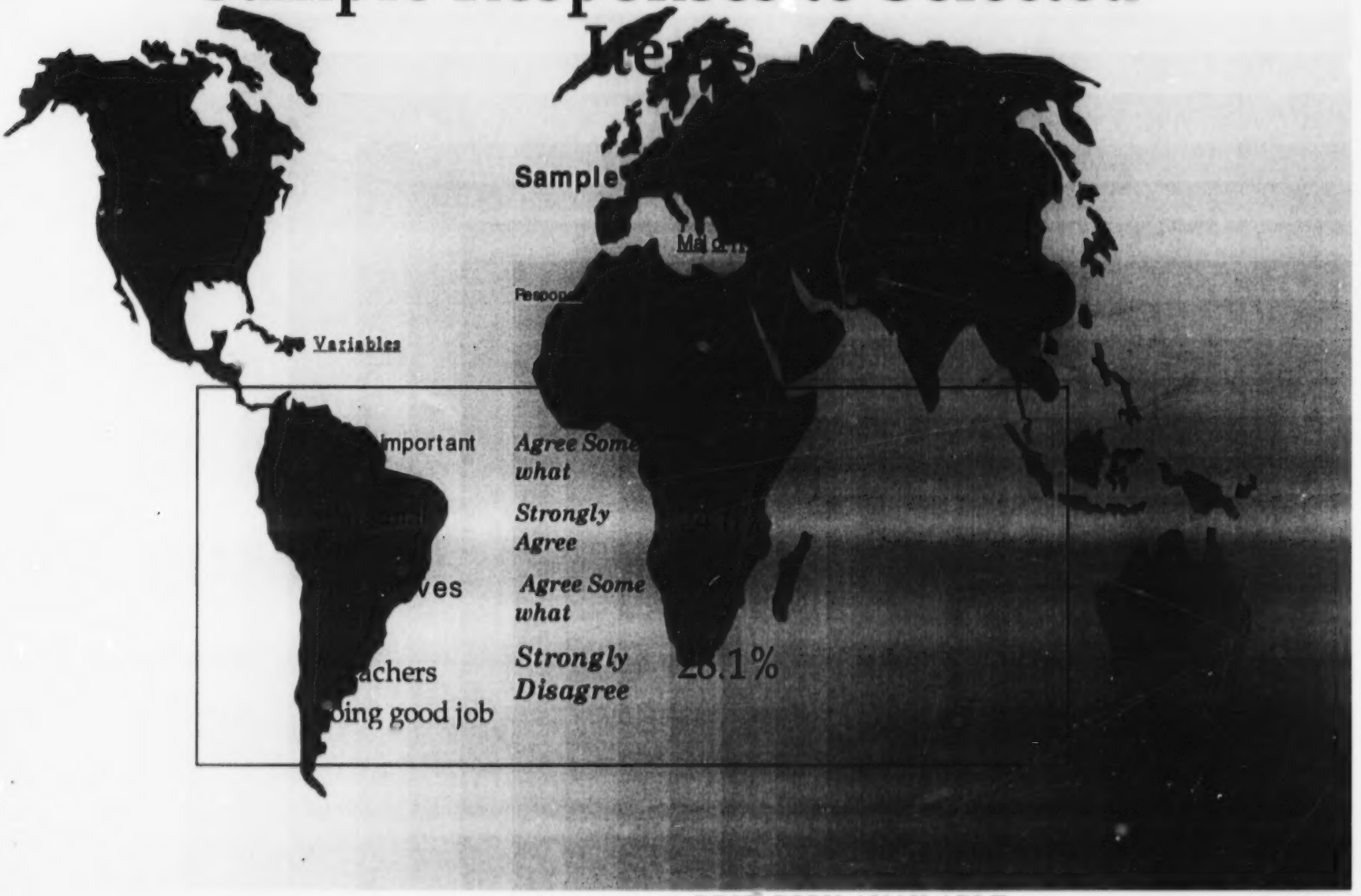




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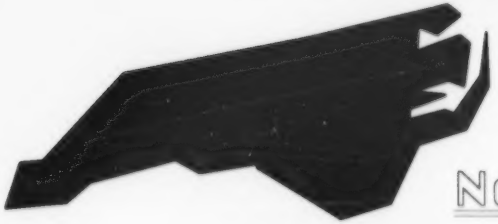
Table 5

# Selected Response Comparisons by State



| Variables | North Carolina Response | Majority Percentage | Alabama Response | Majority Percentage |
|---|---|---|---|---|
| • Teacher effectiveness | *Strongly Disagree* | 33.2% | *Agree Somewhat* | 36.2% |
| • Solutions | *Agree Somewhat* | 31.4% | *Strongly Disagree* | 28.5% |
| • Personal Sacrifice | *Strongly Agree* | 36% | *Disagree* | 36.6% |

Table 6

# Selected Response Comparisons by Grade [illegible]

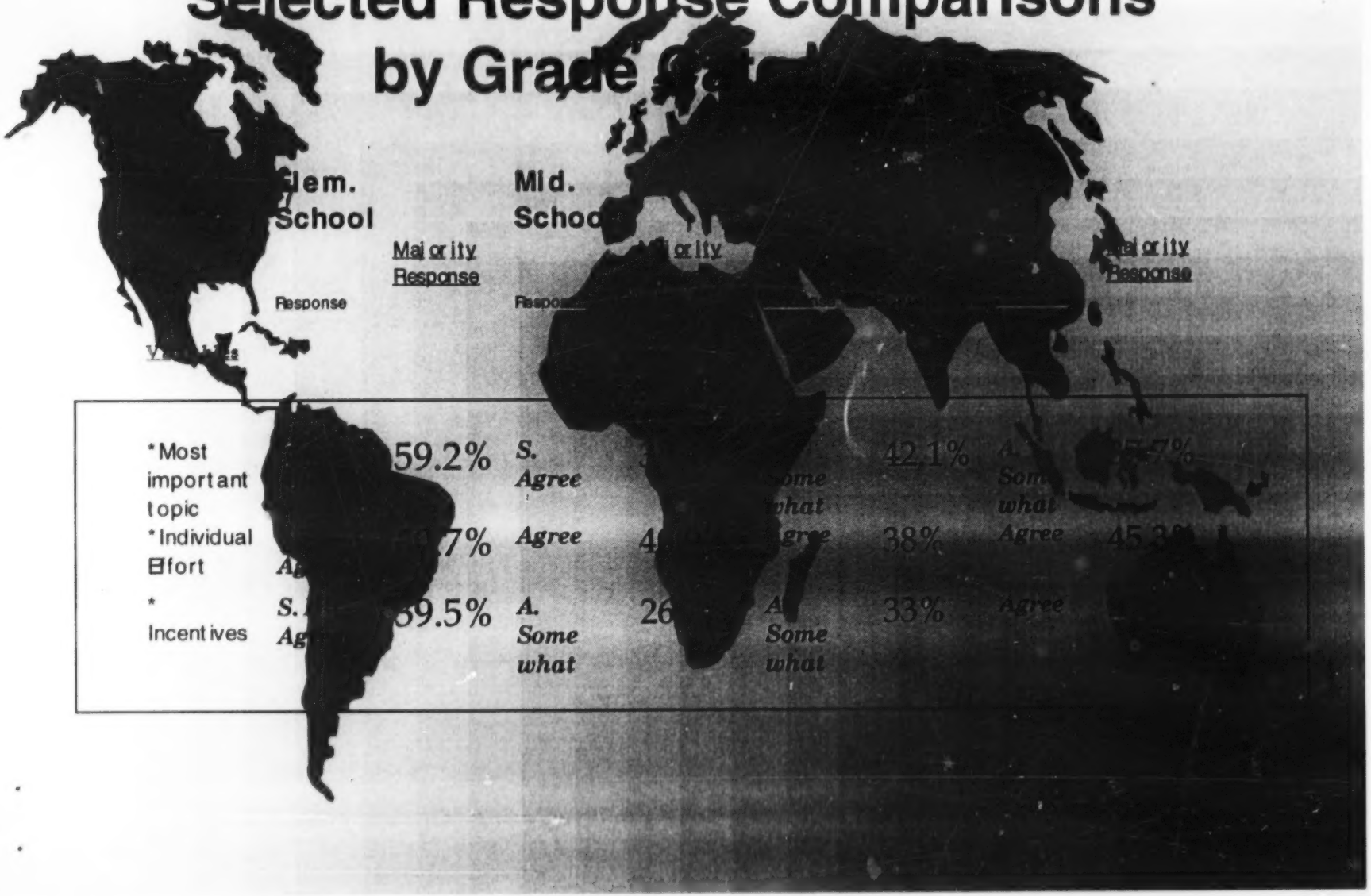





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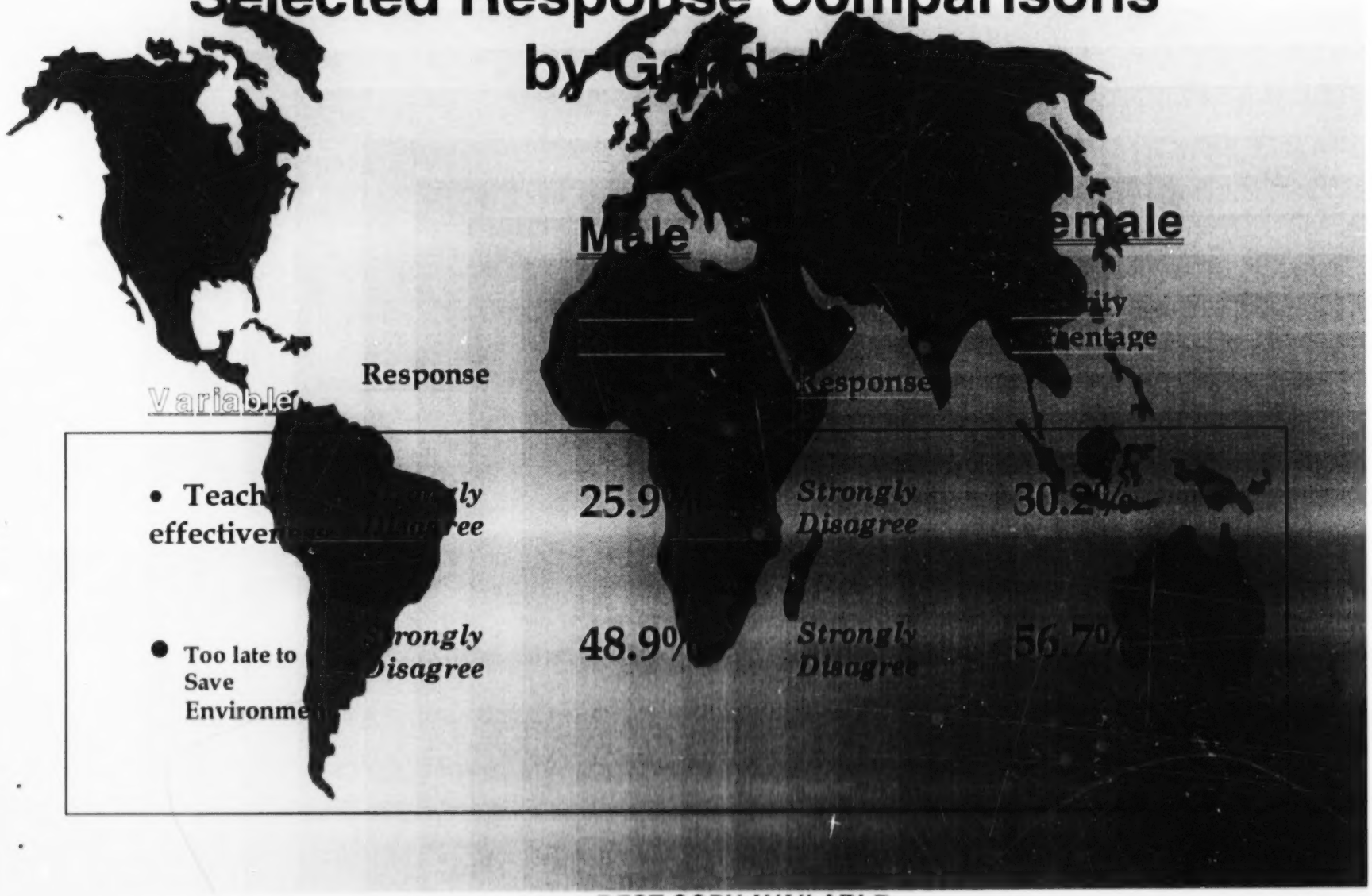
Table 7

# Selected Response Comparisons by Gender



| Variable | Male Response | Male % | Female Response | Female % |
|---|---|---|---|---|
| • Teach effectiver | Strongly Disagree | 25.9 | Strongly Disagree | 30.2% |
| • Too late to Save Environme | Strongly Disagree | 48.9% | Strongly Disagree | 56.7% |



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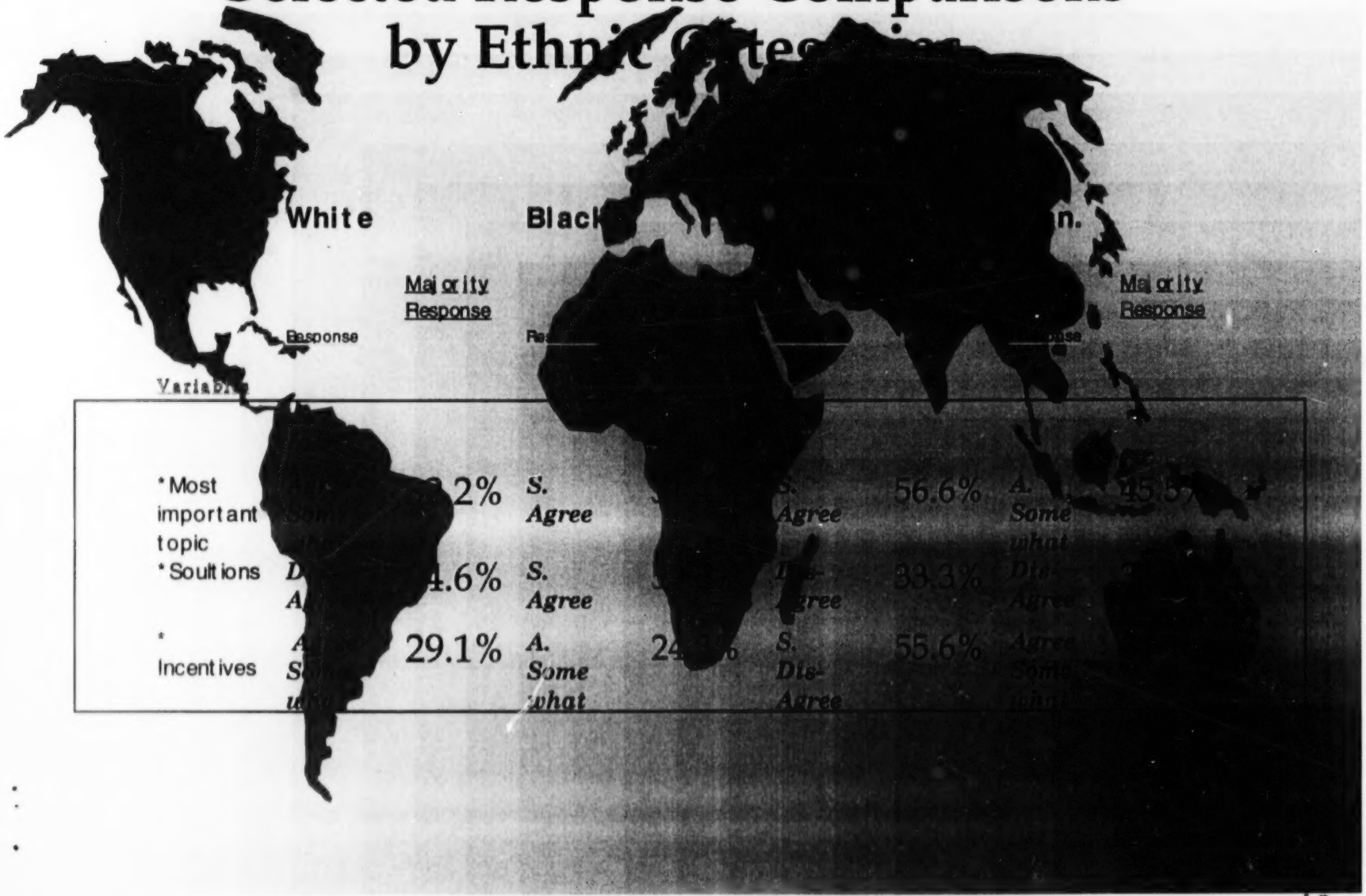
Table 8

# Selected Response Comparisons by Ethnic Categories



| Variable | White Majority Response | White | Black Majority Response | Black | Asian Majority Response | Asian |
|---|---|---|---|---|---|---|
| * Most important topic | S. Agree | 2% | S. Agree | | S. Agree | 56.6% |
| * Soultions | D. A. | 4.6% | S. Agree | | Dis-Agree | 33.3% |
| * Incentives | A. S. | 29.1% | A. Some what | 24 | S. Dis-Agree | 55.6% |

| Variable | Asian Majority Response | Asian |
|---|---|---|
| * Most important topic | A. Some what | 45.5 |
| * Soultions | Dis-Agree | |
| * Incentives | Agree Some | |



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# Population Demographics

AGE Range 8 - 52

## Ethnicity

| | |
|---|---|
| White | 6,333 |
| Black | 1,142 |
| N Am. | 371 |
| Orit. | 375 |
| Hispanic | 613 |

## Grade

| | |
|---|---|
| Elementary | 2,804 |
| Middle School | 1,918 |
| High School | 2,953 |
| University | 1,159 |

N = 8,834

## State

| | |
|---|---|
| Alabama | 7,054 |
| North Carolina | 1,780 |

## GENDER

| | |
|---|---|
| Males | 4,315 |
| Females | 4,519 |



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